

Lessons learnt from Algerian Sahara desert

Ker Rault, P.A.¹; Chouich, A.²; Harmsen, J.¹; Romkens, P.¹; Sijl, G.³; De Kort A.⁴; Zitouni, S.²; Ourahmoune A.²; Chettouh. A.²; Hafouda, L.⁵; Tirichine, A.⁵; Froebrich, J.¹; Vreugdenhil, H.S.I.⁶; Hartani, T.⁷; Khacheba, R.⁷
¹ Alterra WUR The Netherlands, ² Office National de l'Assainissement Algeria, ³ELSTO The Netherlands, ⁴ PB Techniek The Netherlands, ⁵ Institut National de la Recherche Agronomique d'Algérie, ⁶ TU Delft The Netherlands, ⁷ Tipaza University, Algeria

Objectives of WAWRIA

- To give a Second life to water that is already used for domestic purposes and disposed, by appropriate treatment and management.
- Study of treated waste water potential for irrigation in Arid region
- Study accumulation of heavy metals and pathogens in soil & plants
- Train local practitioners to use tertiary treatment device, irrigation techniques with treated waste water
- Contribute to the definition of norms and standards for waste water reuse.
- Study accumulation of Heavy metals (Zn, Cu, Cd, Fe, Al, Sn, Cr...) and pathogens in soil, in plants with 3 type of interface:

Existing Waste water treatment work (aerated lagunes), agro-site (before), greenhouses (after), Irrigation system, water tank for 3 water quality



Experimental setting

A total of 9 green houses were set-up.

One per plant association as below.

1. Potatoes, beetroot (underground)
2. Cucumber, salad, pees (on the ground)
3. Tomatoes: above ground

Each type of plant association was irrigated with 3 water quality:

- A. ground water,
- B. treated wastewater,
- C. polished wastewater with nano-filtration (membrane).

Lettuce, beetroot, tomatoes : planted in Decembre , harvested in February- March)



Results: Horticulture

- Lettuce, potatoes, tomatoes, growt better with TWW. No minerals deficiency and intake of NPK and organic matter
- Salt sensitive plant (Lettuce) grow perfectly under brackish TWW (7g/L).
- The benefits of Treated WasteWater overcomes limiting effect of Salt (NaCl)
- No accumulation of heavy metals in plant nor soil
- No pathogen detected (to be confirmed)
- Dripp irrigation limits contamination, water losses (evapotranspiration, spillage), enable safe farming practices
- Nano filtration remove heavy metals, pathogenes and salt.

Recommendations

- Nano filtration can be a substitute of ground water abstraction and limit impact on fossile ressources, non-renouvelable
- Nano Filtrated water can be used for germination and before harvest
- Soil characteristic improvement thanks to supply of NPK & organic matter: enhance soil fertility
- 2-3 harvests are possible in arid area, under greenhouses
- Potential to develop Agro park, urban green landscape, sustainable water valorisation in compound.